Fermilab

Fermilab Nuclear Materials Control & Accountability

Task Analysis & Training Needs Assessment

FNAL NMC&A-3

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A. Introduction

Fermilab's nuclear materials program is small and limited in scope. Fermilab is graded as a Category IV, Attractiveness Level E facility. Fermilab has no reportable quantities of special nuclear materials.

Fermilab's Nuclear Materials Representative (NMR) is a professional level staff member in the Radiation Protection Group of the Environment, Safety and Health (ES&H) Section. Nuclear materials control and accountability functions comprise approximately 25% of the NMR's total job responsibilities.

Fermilab's Nuclear Materials Control & Accountability (NMC&A) Implementation Plan, Fermilab's NMC&A Program document, Training Approval Program (TAP) Contractor Self-Evaluation Matrix Checklist for Fermilab's NMC&A Program, and this document are the core documents which support Fermilab's training approval process. It is important to note that Fermilab does not design, develop, or conduct nuclear materials control and accountability training. Therefore, many of the areas of the TAP Contractor Self-Evaluation Matrix Checklist are not applicable to Fermilab.

B. Responsibilities

The NMR is responsible for all tasks associated with Fermilab's Nuclear Materials Control and Accountability Program. A NMC&A task inventory has been developed to identify NMR tasks and responsibilities. The task inventory is based upon several documents. The Department of Energy (DOE) Nonproliferation and National Security Institute (NNSI) NMC&A Job Analysis of the Field document was utilized to identify and validate job tasks. The DOE Office of Safeguards and Security Professional Development Guides were also used as a reference. Finally, an inter-comparison of NMC&A tasks and responsibilities outlined in the responsibilities section of Fermilab's Nuclear Materials Control and Accountability Program was performed. Attachment 1 provides a list of tasks that have been identified for Fermilab's NMR.

It is important to note the role of the NMR Alternate. The NMR Alternate is a professional level staff member in the Radiation Protection Group of the ES&H Section. In general, the NMR Alternate does not perform NMC&A functions. The NMR Alternate would perform NMC&A functions only in the event that the NMR permanently relinquishes nuclear materials control and accountability responsibilities. In this case, the NMR Alternate would assume the responsibilities of the NMR and would be required to complete the training required for that of the NMR.

Based on job tasks identified in Attachment 1, appropriate skills and knowledge are necessary for a successful nuclear materials program. Initial and continuing training in nuclear materials control and accountability is necessary. Required National Training Center (NTC) training courses identified in Section L are commensurate with the NMR responsibilities.

Attachment 2 provides a task to training matrix which shows the correlation between job tasks identified in Attachment 1 with NTC training courses.

C. Fermilab NMC&A Program and Procedures

Fermilab Nuclear Materials Control and Accountability Implementation Plan and Program document are developed, reviewed, and revised as necessary to reflect changes in Fermilab's nuclear materials program. Other documents that are reviewed and updated as necessary are:

- Fermilab Site Security Plan
- Fermilab Vulnerability Assessment. The NMR is responsible to participate in vulnerability assessments of Fermilab's safeguards and security program.
- Fermilab Self Assessment Plan

D. Inspections/Assessments

The DOE Chicago Operations Safeguards and Security Services (CH SSS) inspects Fermilab's NMC&A program on a scheduled frequency.

The nuclear materials representative is required to schedule and participate in internal self-assessments of Fermilab's NMC&A program every two years. The NMR is responsible to implement corrective actions identified as a result of these internal self-assessments and also DOE CH SSS inspections in the area of nuclear materials control and accountability.

E. Incident Investigation and Reporting and Emergencies

Documentation of nuclear materials incident investigation and emergency procedures are contained in Fermilab Nuclear Materials Control and Accountability Program document. Fermilab's NMR assists in incident investigation of occurrences involving nuclear materials. The NMR investigates apparent losses of nuclear materials, reports unresolved situations, notifies proper DOE authorities, aids the writing of an investigation report, and identifies corrective actions to prevent future occurrences.

F. Nuclear Materials Management Safeguards System (NMMSS) and Reporting and Safeguards Management Software (SAMS)

DOE M 470.4-6, Chg. 1, Nuclear Material Control and Accountability, requires that contractors report all nuclear materials transactions, materials balances, and inventories to the Nuclear Materials Management Safeguards System (NMMSS). NMMSS is responsible for maintenance of nuclear materials inventory and transaction data for the entire DOE complex. The NMMSS has developed a software program called Safeguards Management Software (SAMS). This software provides a means for Fermilab to input nuclear materials data, perform edit checks on the data, import/export data, and transmit this data electronically to NMMSS. The NMR is required to use this

method of data transmission for all nuclear materials transactions and material balance reports.

G. Nuclear Materials Records and Reports

The NMR completes and maintains nuclear materials control and accountability records. Also, the NMR reviews nuclear materials control and accountability reports generated both internally and externally by DOE CH SSS. The NMR generates and distributes nuclear materials transaction reports (DOE/NRC Form 741), nuclear materials inventory reports (DOE/NRC Form 742), the annual forecast of nuclear materials requirements report, and the annual nuclear materials inventory assessment report. The NMR enters material balance and transaction data into SAMS. The NMR exports the data file to NMMSS. The NMR forwards a copy of quarterly material balance reports to DOE Fermi Site Office (FSO) and DOE CH SSS.

The NMR maintains pertinent records of internal self-assessments and DOE CH SSS inspections.

H. Nuclear Materials Logs and Inventory Databases

The NMR maintains a nuclear materials log, an inventory adjustment log, an on site transfer log, and performs radioactive decay calculations for nuclear materials inventory reports.

The Nuclear Materials Representative maintains and updates inventory databases, inventory reconciliation, and aids in resolution of data entry problems. The NMR maintains and enters changes to the depleted uranium inventory database. The nuclear materials inventory comprising sealed neutron sources is contained in the radioactive source inventory database. The NMR maintains the both uranium and sealed source databases. Both databases are password protected and only Fermilab's NMR and NMR Alternate have access privileges.

I. Physical Inventories and Inventory Verification

The NMR is responsible to notify divisions/sections of nuclear materials physical inventory schedule and due dates for the physical inventory report. The NMR is responsible to conduct annual nuclear materials physical inventories with assistance from divisions/sections. The NMR generates inventory reports for each location where nuclear materials are used and/or stored. Physical inventories are conducted by item and/or container count. The NMR reviews physical inventory reports and reconciles any differences between the database inventory and the physical inventory. The NMR submits an annual physical inventory report to DOE Fermi Site Office and DOE CH SSS.

J. Nuclear Materials Internal Transfers and Off Site Shipments and Receipts

The NMR is responsible to verify authorization of facilities to receive nuclear materials shipped from Fermilab. The NMR initiates, signs, and maintains records of On Site Transfer of Nuclear Materials Forms (R.P. Form # 57) which record internal transfers. The NMR is responsible to obtain nuclear materials transaction information for shipments and receipts of nuclear materials and maintain records of transactions. The NMR notifies the receiver of shipments, conducts transfer checks, documents, and distributes transaction reports on DOE/NRC Form 741. The NMR establishes monitors, evaluates, investigates, and reconciles shipper/receiver differences. The NMR enters transaction data into SAMS, uploads, and sends the data file to NMMSS.

K. Inventory Differences and Inventory Adjustments

The NMR reconciles inventory differences, documents, reports, and records adjustments to nuclear materials inventory. The NMR establishes and documents nuclear materials acceptance and rejection criteria for receipt of nuclear materials. Acceptance/Rejection criteria are based on verification of nuclear materials inventory when it is received on site. The NMR is responsible to notify the shipper of any discrepancies in item count and to resolve the problem. The NMR enters inventory difference and adjustments data into SAMS. The NMR uploads and sends the data file to NMMSS.

L. DOE National Training Center Training Courses

The DOE National Training Center (NTC) provides standardized training for federal and contractor personnel in a wide variety of disciplines including nuclear materials control and accountability. The center offers training in several formats, which include class room, computer-based training, self-study courses, videos, and interactive television courses. All training provided by the NTC is free of charge. However, attendance at classroom training is dependent upon availability of travel funds.

1. Required Training for Fermilab's Nuclear Materials Representative

Based on the above described tasks and responsibilities, the following NTC courses are required for Fermilab's Nuclear Materials Representative (NMR):

a. *Introduction to Nuclear Materials Control and Accountability, MCA-101D, Computer-Based Training (CBT)*

NOTE: MCA-101D IS THE FIRST REQUIRED COURSE AND THE PREREQUISITE FOR ALL OTHER NUCLEAR MATERIALS NMC&A TRAINING COURSES.

This computer-based training course is the prerequisite course for all other nuclear materials accountability courses offered by the NTC. Course topics include properties and characteristics of nuclear materials that are

of interest to safeguard. Nuclear materials categorization levels, historical information regarding the DOE complex, and basic requirements for planning, implementing, and evaluating nuclear materials control and accountability programs are covered.

b. *Transaction Data Systems, MCA 103D, CBT*

This computer-based training course is four hours in length and provides a basic introduction to nuclear materials accounting data submission and reporting requirements. This course introduces the student to the various data entry forms required for reporting nuclear materials transactions, inventory differences, inventory adjustments, and inventory reports to the DOE.

c. *Nuclear Materials Management Safeguards System I, MCA-112*

This course provides an understanding of the facility-supplied information required to be submitted to the Nuclear Materials Management Safeguards System (NMMSS). It explains proper documentation for typical types of materials transfer activities, tools to help with interpretation of DOE requirements, and provides information on the various NMMSS report products provided to NMC&A personnel.

2. Required Training for Nuclear Materials Representative <u>Alternate</u>

a. *Introduction to Nuclear Materials Control and Accountability, MCA-101D, Computer-Based Training (CBT)*

NOTE: MCA-101D IS THE FIRST REQUIRED COURSE AND THE PREREQUISITE FOR ALL OTHER NUCLEAR MATERIALS NMC&A TRAINING COURSES.

This computer-based training course is the prerequisite course for all other nuclear materials accountability courses offered by the NTC. Course topics include properties and characteristics of nuclear materials that are of interest to safeguard. Nuclear materials categorization levels, historical information regarding the DOE complex, and basic requirements for planning, implementing, and evaluating nuclear materials control and accountability programs are covered.

b. *Transaction Data Systems, MCA 103D, CBT*

This computer-based training course is four hours in length and provides a basic introduction to nuclear materials accounting data submission and reporting requirements. This course introduces the student to the various data entry forms required for reporting nuclear materials transactions, inventory differences, inventory adjustments, and inventory reports to the DOE.

Attachment 1

Job Task Inventory for Fermilab Nuclear Materials Control and Accountability Program

The following tasks have been identified for Fermilab's Nuclear Materials Representative:

1. Develop, document, and maintain Fermilab NMC&A program
2. Maintain and revise all documents associated with Fermilab's NMC&A program
3. Revise NMC&A section of Fermilab's Site Security Plan
4. Develop, document, and maintain internal SAMS data entry procedures
5. Maintain nuclear materials inventory databases and enter data into internal database systems
6. Resolve data entry problems
7. Input data to SAMS, upload, and send file to NMMSS
8. Conduct nuclear materials physical inventories
9. Conduct special inventories
10. Reconcile nuclear materials inventory
11. Coordinate on site transfer of nuclear materials
12. Prepare and submit DOE/NRC Form 741, Nuclear Materials Transaction Report
13. Prepare and submit DOE/NRC Form 742, Material Balance Reports
14. Prepare and submit Forecast of Nuclear Materials Requirements Report
15. Prepare and submit Nuclear Materials Inventory Assessment Report
16. Prepare and submit Annual Review of Inventory Adjustments Report
17. Prepare and submit Annual Nuclear Materials Physical Inventory Report
18. Maintain and file Monthly Sealed Neutron Source Physical Inventory Report
19. Prepare excess material declarations
20. Maintain nuclear materials logs
21. Maintain nuclear materials decay calculations
22. Report inventory adjustments
23. Maintain training record log
24. Obtain nuclear materials transaction information for materials shipments/receipts
25. Notify receiver of shipment
26. Establish, monitor, evaluate, investigate, and reconcile shipper/receiver difference
27. Support external inspections
28. Participate in NMC&A program internal assessments
29. Maintain pertinent records of NMC&A program reviews, audits, and assessments
30. Correct any deficiencies identified from both internal and external program reviews
31. Coordinate investigation of incidents
32. Report unresolved situations

Attachment 2

Fermilab Nuclear Materials Control & Accountability Program
Task to Training Matrix

Nuclear Materials Management Safeguards System (NMMSS) I, MCA-112	• Develop, document, and maintain internal data entry procedures • Maintain nuclear materials inventory databases and enter data into internal database systems • Resolve data entry problems • Data input to SAMS, upload, and send file to NMMSS • Reconcile nuclear materials inventory • Coordinate on site transfer of nuclear materials • Prepare and submit DOE/NRC Form 741, Nuclear Materials Transaction Report • Prepare and submit DOE/NRC Form 742, Material Balance Report • Prepare and submit Nuclear Materials Inventory Assessment Report • Obtain nuclear materials transaction information for materials shipment/receipt • Notify receiver of shipment
Introduction to NMC&A, MCA 101-1, Materials Accounting for Nuclear Safeguards	• Prepare and submit Forecast of Nuclear Materials Requirements Report • Prepare and submit Nuclear Materials Inventory Assessment Report • Prepare and submit Annual Review of Inventory Adjustments Report • Prepare excess materials declarations • Maintain nuclear materials logs • Maintain nuclear materials decay calculations • Obtain nuclear materials transaction information for materials shipment/receipt • Notify receiver of shipment • Establish, monitor, evaluate, investigate, and reconcile shipper/receiver difference
Nuclear Materials NMC&A Training Video Teleconference	• Maintain nuclear materials training record log
Introduction to Job Analysis Correspondence Course	• Maintain nuclear materials training record log

Introduction to NMC&A Measurement Programs Correspondence Course, MCA 104D	• Conduct nuclear materials physical inventories • Prepare and submit Annual Nuclear Materials Physical Inventory Report • Maintain and file Monthly Sealed Neutron Source Physical Inventory Report • Maintain nuclear materials decay calculations • Report inventory adjustments • Establish, monitor, evaluate, investigate, and reconcile shipper/receiver difference
Introduction to NMC&A, MCA 101-1	• Develop, document, and maintain Fermilab NNMC&A program • Conduct special inventories
Introduction to Basic Survey Correspondence Course, PHY-128D	• Support external inspections • Maintain pertinent records of NMC&A program reviews, audits, and assessments • Participate in NMC&A program internal assessments • Correct any deficiencies identified from both internal and external program reviews • Coordinate investigation of incidents • Report unresolved situations
Measurement Control for NMC&A, MCA-144	• Coordinate and verify nuclear materials physical inventories • Prepare and submit Annual Nuclear Materials Physical Inventory Report • Maintain and file Monthly Sealed Neutron Source Physical Inventory Report
Introduction to Physical Security Systems Correspondence Course	• Support external inspections

Introduction to Transaction Data System, MCA-103D	• Develop, document, and maintain internal SAMS data entry procedures • Maintain nuclear materials inventory databases and enter data into internal database systems • Resolve data entry problems • Data input to SAMS, upload, and send file to NMMSS • Reconcile nuclear materials inventory • Coordinate on site transfer of nuclear materials • Prepare DOE/NRC Form 741, Nuclear Materials Transaction Report • Prepare DOE/NRC Form 742, Material Balance Report • Report inventory adjustments • Obtain nuclear materials transaction information for materials shipment/receipt • Notify receiver of shipment
Vulnerability Assessment Overview, CTA-139D	• Revise NMC&A section of Fermilab's Site Security Plan • Prepare and submit Forecast of Nuclear Materials Requirements Report